

## **AMENDMENTS TO THE CLAIMS**

The following listing of claims will replace all prior versions and listings of claims in the application.

### **LISTING OF CLAIMS**

1. (Currently Amended) A speaker authentication system, comprising:

an input receptive of speech spoken by user speech from a user;

an extraction module receives speech from the input and extracts glottal source parameters indicative of a glottis of the user from the speech adapted to extract acoustic correlates of aspects of the user's physiology from the user speech, including at least one of glottal source parameters, formant related parameters, timing characteristics, and pitch related qualities; and

an authentication module receives glottal source parameters from the extraction module and authenticates the user by comparing the glottal source parameters to glottal source parameters stored in a data store

an output communicating the acoustic correlates to an authentication module adapted to authenticate the user by comparing the acoustic correlates to predefined acoustic correlates in a data store.

2. (Original) The system of claim 1, wherein said extraction module is adapted to extract glottal source parameters that include spectral qualities.

3. (Original) The system of claim 1, wherein said extraction module is adapted to extract glottal source parameters that include breathiness.

4. (Original) The system of claim 1, wherein said extraction module is adapted to extract glottal source parameters that include noise content.

5. (Original) The system of claim 1, wherein said extraction module is adapted to extract glottal source parameters that include jitter and shimmer related to fluctuations in pitch period and amplitude.

6. (Original) The system of claim 1, wherein said extraction module is adapted to extract glottal source parameters that include glottal source waveform shape related to phase information.

7. (Withdrawn) The system of claim 1, wherein said extraction module is adapted to extract formant related parameters that include a pattern of high formants related to head shapes and cavities.

8. (Withdrawn) The system of claim 1, wherein said extraction module is adapted to extract formant related parameters that include an estimate of vocal tract length.

9. (Withdrawn) The system of claim 1, wherein said extraction module is adapted to extract formant related parameters that include low formant patterns related to at least one of accent and dialect.

10. (Withdrawn) The system of claim 1, wherein said extraction module is adapted to extract formant related parameters that include an estimate of nasality related to velum opening.

11. (Withdrawn) The system of claim 1, wherein said extraction module is adapted to extract formant related parameters that include formant bandwidth.

12. (Withdrawn) The system of claim 1, wherein said extraction module is adapted to extract timing characteristics at a phoneme level.

13. (Withdrawn) The system of claim 1, wherein said extraction module is adapted to extract pitch related qualities that include characteristic derived from clustered training data.

14. (Withdrawn) The system of claim 1, further comprising a dialogue manager adapted to require the user to copy speech of a prompt when providing the user speech.

15. (Withdrawn) The system of claim 1, further comprising a dialogue manager adapted to require the user to perform a distracting task while providing the user speech input.

16. (Withdrawn) The system of claim 1, further comprising a scoring mechanism adapted to combine multiple feature sets differentiated according to modality using combining weights that are sensitive to changes in context and environment.

17. (Withdrawn) The system of claim 1, further comprising a communications network conveying the acoustic correlates to the authentication module, wherein the authentication module is adapted to generate an authentication decision and transmit the decision across the network to an input of the speaker authentication system.

18. (Currently Amended) A speaker authentication method, comprising:  
receiving speech spoken by user ~~speech from~~ a user;  
extracting glottal source parameters which correlate to a glottal of the user from the speech ~~acoustic correlates of aspects of the user's physiology from the user speech, including at least one of glottal source parameters, formant related parameters, timing characteristics, and pitch related qualities;~~ and  
authenticating the user by comparing the glottal source parameters to glottal source parameters previously captured from the user ~~communicating the acoustic correlates to an authentication module adapted to authenticate the user by comparing the acoustic correlates to predefined acoustic correlates in a datastore.~~

19. (Original) The method of claim 1, further comprising extracting glottal source parameters that include spectral qualities.

20. (Original) The method of claim 1, further comprising extracting glottal source parameters that include breathiness.

21. (Original) The method of claim 1, further comprising extracting glottal source parameters that include noise content.

22. (Original) The method of claim 1, further comprising extracting glottal source parameters that include jitter and shimmer related to fluctuations in pitch period and amplitude.

23. (Original) The method of claim 1, further comprising extracting glottal source parameters that include glottal source waveform shape related to phase information.

24. (Withdrawn) The method of claim 1, further comprising extracting formant related parameters that include a pattern of high formants related to head shapes and cavities.

25. (Withdrawn) The method of claim 1, further comprising extracting formant related parameters that include an estimate of vocal tract length.

26. (Withdrawn) The method of claim 1, further comprising extracting formant related parameters that include low formant patterns related to at least one of accent and dialect.

27. (Withdrawn) The method of claim 1, further comprising extracting formant related parameters that include an estimate of nasality related to velum opening.

28. (Withdrawn) The method of claim 1, further comprising extracting formant related parameters that include formant bandwidth.

29. (Withdrawn) The method of claim 1, further comprising extracting timing characteristics at a phoneme level.

30. (Withdrawn) The method of claim 1, further comprising extracting pitch related qualities that include characteristic derived from clustered training data.

31. (Withdrawn) The method of claim 1, further comprising requiring the user to copy speech of a prompt when providing the user speech.

32. (Withdrawn) The method of claim 1, further comprising requiring the user to perform a distracting task while providing the user speech input.

33. (Withdrawn) The method of claim 1, further comprising combining multiple feature sets differentiated according to modality by using combining weights that are sensitive to changes in context and environment.

34. (Withdrawn) The method of claim 1, further comprising:  
conveying the acoustic correlates to the authentication module via a communications network; and  
receiving an authentication decision generated by the authentication system via the communications network.